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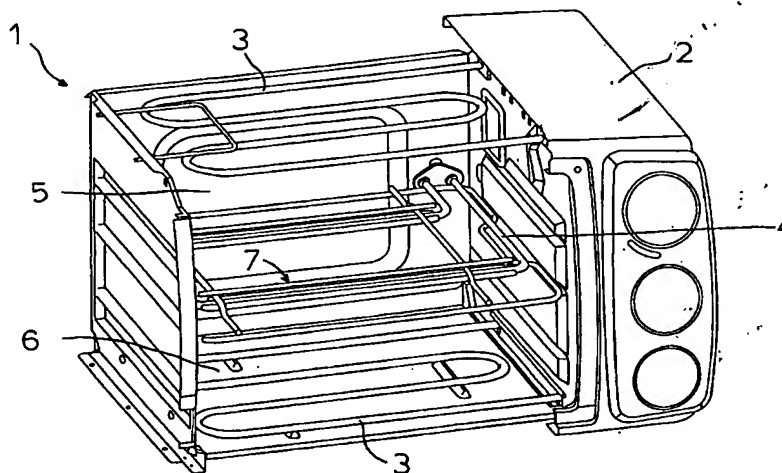
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(54) Title: ELECTRICALLY POWERED OVEN, IN PARTICULAR FOR BAKING OR HEATING SLICED BREAD, AND HEATING PROCEDURE



(57) Abstract: The electrically powered oven, in particular for baking or heating sliced bread, comprises a box-shaped body inside which there are housed one or more electrical resistors adapted to radiate energy into the body for baking or heating sliced bread. A resistor is arranged into the body, so as to determine at least two baking chambers, and exhibits baffle means adapted to direct the radiated energy towards the baking chambers. The procedure for heating the electrically powered oven in particular for baking or heating sliced bread consists in radiating energy mainly towards the lower portion of the oven by a resistor, which is arranged in an intermediate position of the box-shaped body of the oven and which determines at least two baking chambers, so that the effect of natural convection into the two baking chambers is comparable.

ELECTRICALLY POWERED OVEN, IN PARTICULAR FOR BAKING OR HEATING SLICED BREAD, AND HEATING PROCEDURE.

DESCRIPTION

The present invention relates to an electrically powered oven, in particular for baking or heating sliced bread, and to a heating procedure.

In particular in the following description, reference shall be made to electrically powered ovens, that is, provided with electrical resistors capable of radiating energy in the form of infrared radiations.

Ovens of this type comprise a box-shaped body provided with electrical heating resistors arranged at their upper and lower walls.

Ovens of this type define a single baking chamber and therefore exhibit a very restricted capacity (in fact, such ovens are often small sized).

Moreover, despite the small size, the distance of upper and lower resistors is too much to allow baking sliced bread on both faces evenly, quickly and with a low energy consumption.

Multiple baking-chamber ovens have been developed in order to increase the oven capacity and reduce the distance of resistors from the sliced bread.

Such ovens exhibit an inside intermediate wall which usually delimits two baking chambers reciprocally superimposed.

Moreover, in order to ensure a good radiance, and therefore sufficiently quick and even baking or heating, traditional ovens are provided with additional resistors arranged at each of the two

faces of the intermediate wall.

However, traditional ovens exhibit several disadvantages that occur both during use and during production.

In fact in the first case the advantages mainly relate to the high electrical consumption caused by the dual central resistor and to the great difficulty of cleaning the baking chambers, since the resistors housed in the proximity of the intermediate wall hinder access to the same and make access to the farthest edges from the access port very difficult.

Moreover, sliced bread must be arranged as close as possible to the resistors to optimise the sliced bread toasting.

This implies that in such ovens it is not possible to bake other foodstuff besides slices of bread.

In fact, due to the limited distance between the foodstuff to bake and the resistors, and due to the high temperatures at which the same resistors are brought, traditional ovens are not suitable for baking other products than slices of bread.

In products that are not sliced bread, in fact, it is necessary to supply thermal energy very slowly so as to optimise thermal diffusion from outermost to innermost layers in order to prevent burning the surface of the foodstuff being baked before heat diffuses inside it for a complete baking of the product, due to the high resistor temperature.

On the other hand in the second case, the fact of having to apply an intermediate wall into the oven body and two electrical resistors implies several additional treatments and costs due to the higher number of elements used.

Therefore, the technical task of the present invention is to realise an electrically powered oven, in particular for baking or heating sliced bread, and a heating procedure thereof, which should allow eliminating the technical disadvantages of the prior art.

Within the scope of this technical purpose, an object of the invention is to realise an oven whose electrical consumption should be lower than traditional ovens, number of baked slices of bread being equal.

Another object of the invention is to realise an oven which should be easy to clean in all of its parts, also at the edges that are far from the access port.

A further object of the invention is to realise an oven which should be suitable for baking various products, also different from slices of bread, thoroughly and without burning their surface.

Last but not least, another object of the invention is to realise an oven with restricted costs and times compared to what required with traditional ovens, and which should be capable of baking up to six slices of bread at the same time (six above and six below).

The technical task, as well as these and other objects according to the present invention are achieved by realising an electrically powered oven, in particular for baking or heating sliced bread, comprising a box-shaped body inside which there are housed one or more electrical resistors intended to radiate energy into said body for baking or heating said sliced bread,

characterised in that at least one resistor is arranged into said body so as to determine at least two baking chambers and exhibits baffle means intended to direct said radiated energy towards said baking chambers.

Advantageously, the present finding also relates to a procedure for heating an electrically powered oven, in particular for baking or heating sliced bread, characterised in that it consists in radiating energy mainly towards the lower portion of said oven by at least one resistor, which is arranged in an intermediate position of the box-shaped body and which determines at least two baking chambers, so that the effect of natural convection into said baking chambers is comparable.

Moreover, further features of the present invention are defined in the other claims.

Further features and advantages of the invention will appear more clearly from the description of a preferred but non-limiting embodiment of the electrically powered oven, in particular for baking or heating sliced bread, and of the procedure for heating it according to the finding, where the oven is shown by way of a non-limiting example in the attached drawings. In such drawings:

- figure 1 shows a perspective view of an oven according to the present finding, without a portion of its box-shaped body;
- figure 2 shows an enlarged detail of the baking chambers of the oven according to the finding; and
- figure 3 shows an enlarged detail of a support frame and of an electrical resistor of the oven according to the finding.

With reference to the figures mentioned above, an electrically

powered oven, in particular for baking or heating sliced bread, is shown and globally referred to with reference numeral 1.

Oven 1 comprises a box-shaped body 2 (only partly shown) inside which there are housed one or more electrical resistors 3 intended to radiate energy into body 2 to bake or heat the sliced bread (not shown).

Advantageously, a resistor 4 is arranged into body 2 (in an intermediate position between the upper and lower walls) so as to determine at least two baking chambers 5, 6; advantageously, resistor 4 exhibits baffle means 7 adapted to direct the radiated energy towards the baking chambers 5, 6.

The baffle means 7 comprises first elongated members 8 arranged at the sides of at least one portion (and in particular, of two portions 20) of resistor 4; the two portions 20 of resistor 4 are reciprocally jointed by other shorter portions 21 and 22 of the same resistor 4.

In the example shown, the two reciprocally parallel portions 20 of resistor 4 are sided at the two sides by the elongated members 8.

Such first members 8 are connected to a support frame 9 and define seats wherein portions of resistor 4 are slidably held.

In this way, frame 9 can support resistor 4, thereby overcoming all problems related to the deformations undergone by resistor 4 and by frame 9 itself due to the high temperatures.

Advantageously, the support frame 9 allows heat transfer by convection between the two baking chambers 5, 6; in fact, as shown in the attached figures, frame 9 exhibits a grid-like structure,

but in other examples frame 9 exhibits a plate-like structure provided with several air passages between the two baking chambers 5, 6.

Moreover, the support frame 9 exhibits bars bent upwards 10 connected to first members 8 and portions 11 bent inwards, so that resistor 4 is held between the seats and the bent portions 11 of frame 9.

Moreover, the baffle means 7 also comprises second members 12 adapted to hinder the radiation of radiating energy towards the upper portion of body 2 of oven 1.

In particular the second members 12 exhibit an elongated shape and are arranged above at least one portion of resistor 4.

In the example shown, each of the two portions at which members 8 are connected is overlapped by an elongated member 12.

In a first embodiment of the oven according to the finding (shown in the attached figures), the first and/or second members are realised by bars connected to the support frame 9.

In a second embodiment (not shown in the attached figures), the first and/or second members are made of a bent sheet connected to the support frame.

In order to improve the radiance distribution, besides members 12 that partly hinder the energy radiated by resistor 4 towards the upper portion of body 2 of oven 1, the two short opposed portions 21 and 22 of resistor 4 remain cold upon switch on.

In substance, therefore, heat is only radiated by portions 20 of the resistor, thereby avoiding zones of the slices of bread from being radiated unevenly.

This allows an even baking of the twelve slices of bread, thereby preventing some slices from being more baked than other slices of bread.

The operation of the electrically powered oven in particular for baking or heating sliced bread according to the invention clearly appears from what described and illustrated. In particular, it substantially is as follows.

In particular, the slices of bread are arranged into the box-shaped body 2 and the oven is switched on (for example, by setting a timer).

Resistors 3, 4 heat up and start radiating energy into the box-shaped body 2, which bakes or heats the slices of bread.

Baking is effective since the intermediate resistor 4 radiates both the upper chamber 5 and the lower chamber 6 at the same time.

Moreover, the same intermediate resistor 4 preferably radiates towards the lower baking chamber 6; the lower baking chamber 6 therefore tends to heat more than the upper baking chamber 5; this generates convective motions that allow a very even heat distribution between the two baking chambers which, in the practice, prevent hot air from accumulating in the upper baking chamber.

This allows considerably improving the baking evenness.

Of course, even though reference is always made to the baking or heating of sliced bread, the oven according to the present finding can be used for any type of food.

In a preferred embodiment, the oven according to the finding exhibits resistor control means adapted to repeatedly switch on

and off the resistors to prevent their surface from reaching a sufficiently high temperature, thereby generating an intense radiance.

Advantageously, the control means is adapted to detect the temperature into the oven and switch the resistors on or off also in relation with such temperature.

The control means comprises, for example, an amperometric bimetallic thermostat electrically connected in series to the resistors, adapted to get deformed (switching the resistors on or off) due to the temperature inside the oven.

Advantageously, such thermostat is also sensitive to the current absorbed by the resistors.

Such current produces a further overheating of the thermostat sensitive member which adds to that of the air heated by the resistors.

In the practice, therefore, the resistor power supply current contributes to heating the bimetallic thermostat with very quick response times and therefore, very frequent successive switching on and off of the resistors.

In this way the maximum temperature reached by the resistor surface remains limited and the radiance effect is therefore reduced.

The present finding also relates to a procedure for heating an electrically powered oven in particular for baking or heating sliced bread.

The procedure consists in radiating energy mainly towards the lower portion of the oven by at least one resistor 4, which is

arranged in an intermediate position of the box-shaped body 2 of oven 1 and which determines at least two baking chambers 5, 6, so that the effect of natural convection into the baking chambers 5, 6 is comparable.

Advantageously, the procedure according to the present finding provides for the repeated switching on and off of the resistors, so as to limit the maximum temperature reached by their surface for limiting its radiance.

In the practice, it has been proved that the electrically powered oven, in particular for baking or heating sliced bread, and the procedure for heating it according to the invention, are especially advantageous since they allow realising ovens which exhibit low consumption and require lower production costs compared to traditional ovens.

The electrically powered oven, in particular for baking or heating sliced bread, and the procedure for heating it thus designed can be subject to several changes and variants, all falling within the scope of the inventive idea; moreover, all details can be replaced with technically equivalent elements.

In the practice, the materials used as well as the sizes can be of any type according to the requirements and to the prior art.

CLAIMS

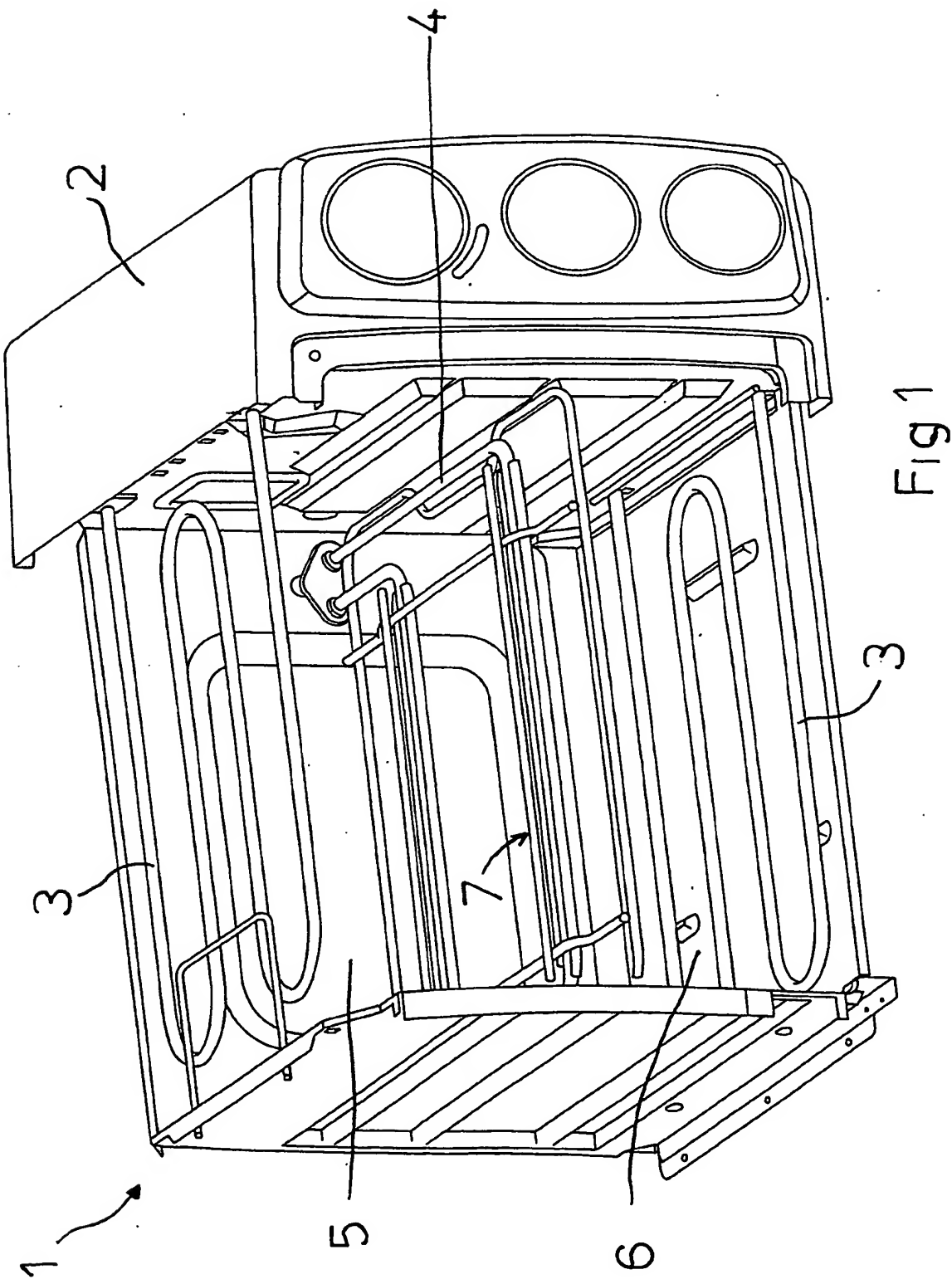
1. Electrically powered oven, in particular for baking or heating sliced bread, comprising a box-shaped body inside which there are housed one or more electrical resistors intended to radiate energy into said body for baking or heating said sliced bread, characterised in that at least one resistor is arranged into said body so as to determine at least two baking chambers and exhibits baffle means intended to direct said radiated energy towards said baking chambers.
2. Electrically powered oven according to claim 1, characterised in that said baffle means comprises first elongated members arranged at the sides of at least one portion of said resistor.
3. Electrically powered oven according to one or more of the previous claims, characterised in that said first members are connected to a support frame and define seats wherein portions of said resistor are slidably held.
4. Electrically powered oven according to one or more of the previous claims, characterised in that said support frame allows heat transfer by convection between the two baking chambers.
5. Electrically powered oven according to one or more of the previous claims, characterised in that said support frame exhibits bars bent upwards connected to said first members, said frame exhibiting portions bent inwards, so that said resistor is held between said seats and said bent portions of said frame.
6. Electrically powered oven according to one or more of the previous claims, characterised in that said baffle means comprises second members adapted to hinder the radiance of said

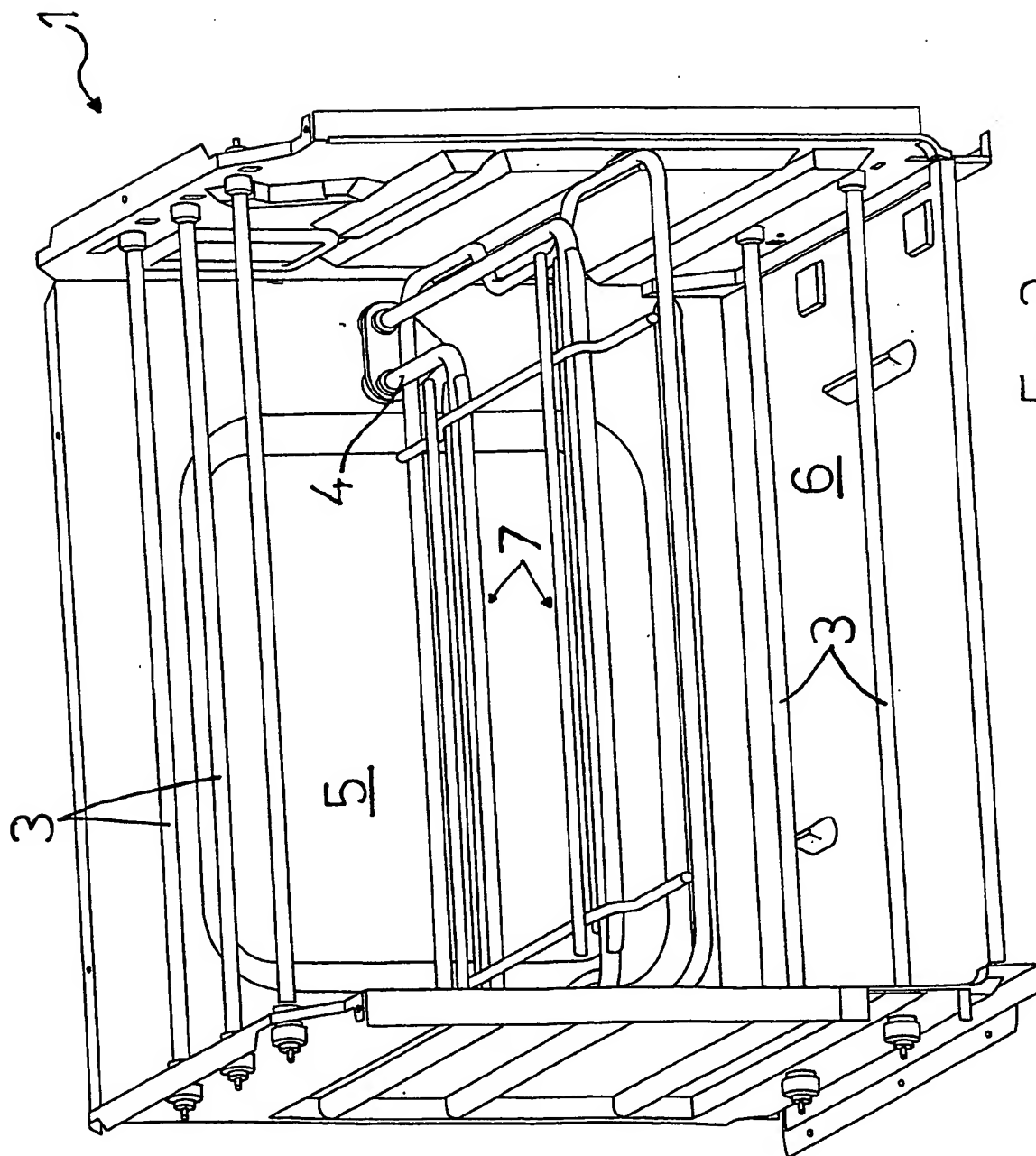
radiating energy towards the upper portion of said body of said oven.

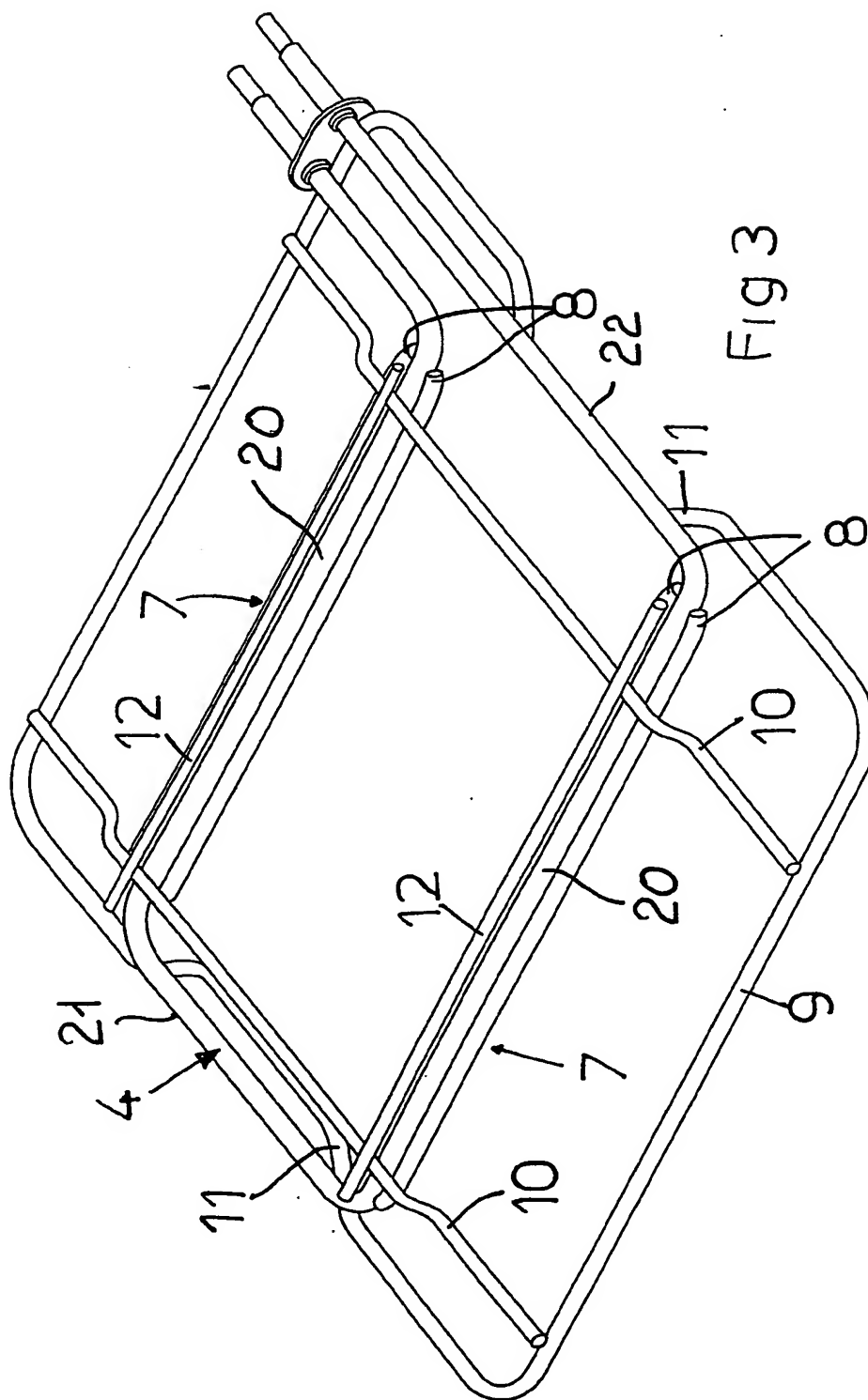
7. Electrically powered oven according to one or more of the previous claims, characterised in that said second members exhibit an elongated shape and are arranged above at least one portion of said resistor.
8. Electrically powered oven according to one or more of the previous claims, characterised in that said first and/or said second members are realised by bars connected to said support frame.
9. Electrically powered oven according to one or more of the previous claims, characterised in that said first and/or said second members are made of bent sheet connected to said support frame.
10. Electrically powered oven according to one or more of the previous claims, characterised in that two shorter and opposed portions of said resistor remain cold upon switch on of said resistor.
11. Electrically powered oven according to one or more of the previous claims, characterised in that it exhibits resistor control means adapted to repeatedly switch said resistors on and off to prevent their surface from reaching a sufficiently high temperature thereby generating an intense radiance.
12. Electrically powered oven according to one or more of the previous claims, characterised in that said control means is adapted for detecting the temperature inside said oven and is adapted to switch the resistor on an off also in relation to

said temperature.

13. Electrically powered oven according to one or more of the previous claims, characterised in that said control means comprises an amperometric bimetallic thermostat electrically connected in series to said resistors, said thermostat being adapted to switch on due to the temperature inside the oven and moreover, due to the heat produced by the power supply current of said resistors.
14. Procedure for heating an electrically powered oven, in particular for baking or heating sliced bread, characterised in that it consists in radiating energy mainly towards the lower portion of said oven by at least one resistor, which is arranged in an intermediate portion of the box-shaped body of the oven, and which determines at least two baking chambers, so that the effect of natural convection into said chambers is comparable.
15. Procedure according to the previous claim, characterised in that it provides for the repeated switching on and off of the resistors so as to limit the maximum temperature reached by their surface for limiting the radiance.
16. Electrically powered oven, in particular for baking or heating sliced bread, and procedure for heating it, all as substantially described, represented in the attached drawing tables, and claimed.







INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 F24C7/06 A47J37/06 A47J37/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 F24C A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 174 079 A (DADSON THOMAS E) 26 September 1939 (1939-09-26) page 1, column 2, line 43 -page 2, column 1, line 41; figures 1,2	1-4, 6, 7, 9, 12, 14-16
X	DE 42 17 545 A (LICENTIA GMBH) 2 December 1993 (1993-12-02) the whole document	1, 2, 11-16
X	AP 470 A (BARLOWS MFG CO) 5 March 1996 (1996-03-05) page 4, paragraph 1 -page 5, paragraph 1; figures 1,2	1, 2, 11-16
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- * & * document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 02/12055

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

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